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WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION See paragraph 2 below

International application No.
PCT/IB2005/051097

International filing date (day/month/year)
01.04.2005

Priority date (day/month/year)
09.04.2004

International Patent Classification (IPC) or both national classification and IPC
G11B20/14, H03M5/14

Applicant
KONINKLIJKE PHILIPS ELECTRONICS N.V.

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2005/051097

Box No. I Basis of the opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - a sequence listing
 - table(s) related to the sequence listing
 - b. format of material:
 - in written format
 - in computer readable form
 - c. time of filing/furnishing:
 - contained in the international application as filed.
 - filed together with the international application in computer readable form.
 - furnished subsequently to this Authority for the purposes of search.
3. In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. II Priority

1. The validity of the priority claim has not been considered because the International Searching Authority does not have in its possession a copy of the earlier application whose priority has been claimed or, where required, a translation of that earlier application. This opinion has nevertheless been established on the assumption that the relevant date (Rules 43bis.1 and 64.1) is the claimed priority date.
2. This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43bis.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2005/051097

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or
industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	10,18
	No: Claims	1-9,11-17,19-24
Inventive step (IS)	Yes: Claims	
	No: Claims	1-24
Industrial applicability (IA)	Yes: Claims	1-24
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1. Reference is made to the following document:

D1: WO 03/021791 A (KONINKLIJKE PHILIPS ELECTRONICS N.V) 13 March
2003 (2003-03-13)

2. The present application does not meet the requirements of Art.6 PCT, because there are inconsistencies between the claims and the description. In the following it will be assumed that these inconsistencies should be resolved as follows.
 - 2.1 Claim 4 should specify the transformer decoder, not the transformer encoder (see p.9, II.22-24, and transformer decoder 220 in Figs.1, 3).
 - 2.2 The decoding method of claim 14 should filter the encoded signal by means of the polynomial function $b(D)$, not by its inverse $1/b(D)$, to obtain the intermediate signal t (see p.9, II.22-24).
3. Furthermore, the above-mentioned lack of clarity notwithstanding, the subject-matter of independent claims 1, 7, 14, 15, and 22-24 is not new in the sense of Art.33(2) PCT.
 - 3.1 Document **D1** discloses a modulation code system (Fig.1 of **D1**) comprising
 - (a) a modulation code encoder (Fig.1, 110) for coding the original signal s into an intermediate signal t satisfying first constraints (p.4, II.21-25),
 - (b) a transformer encoder (Fig.1, 120) for converting said intermediate signal t in order to generate an encoded signal c satisfying a predefined second constraint (p.4, II.21-25),
 - (c) means for supplying the encoded signal to a medium (p.4, II.31-32),
 - (d) means for retrieving the encoded signal from said medium (p.5, I.1),
 - (e) a transformer decoder (Fig.1, 220) for converting the encoded signal c so as to

obtain said intermediate signal t (p.5, II.2-3), and

(f) a modulation code decoder (Fig.1, 210) for decoding said intermediate signal t into said original signal s (p.5, II.3-4).

Furthermore the modulation code system of **D1** has the following two features (see the two paragraphs below):

(g) the transformer decoder is adapted to convert a signal that violates the predefined second constraint into another signal that violates the predefined first constraint, and

(h) the transformer decoder has a polynomial function, and the transformer encoder has the inverse polynomial function.

That feature (g) is necessarily present in the system of **D1** can be shown as follows. Feature (e) stipulates that the transformer decoder inverts the operation of the transformer encoder. Assume that feature (g) was missing, i.e. that the transformer decoder converted a signal that violates the second constraint into a signal that meets the first constraint. In this case the transformer encoder would invert the operation of the transformer decoder by converting a signal that meets the first constraint into a signal that violates the second constraint, which would be a contradiction to feature (b).

Feature (h) is apparent from Figs.1-3 of **D1**. Considering the simplest embodiment of transformer decoder 220 in Fig.1, i.e. limiting it to two differentiators 220-1 and 220-2 as depicted in Fig.3, it can easily be verified that the transformer decoder will have the polynomial function $(1+D^2)$. Similarly choosing two integrators 120-1 and 120-2 (Fig.2) to implement transformer encoder 120 (Fig.1), one will obtain a transformer encoder with the inverse polynomial function $1/(1+D^2)$.

Therefore the subject-matter of independent claim 1 is not new.

3.2 Independent claim 7 relates to the decoder which is already defined by claim 1. Independent claim 14 appears to relate to the corresponding decoding method. Independent claims 15 and 22 relate to the encoder and the encoding method.

Independent claims 23 and 24 respectively relate to the signal obtained with the encoding method, and to the record carrier on which the signal is stored. None of these claims adds further subject-matter to what is already defined by claim 1. Therefore the subject-matter of claims 7, 14, 15, and 22-24 is not new either.

4. Dependent claims 2-6, 8-13, and 16-21 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty or inventive step:
 - (a) claims 2, 8, 16: the first and second constraints disclosed in **D1** are a "*k-constraint*" and an "*anti-whistle-constraint*", respectively (p.3, II.8-10; p12, II.1-5). Hence the subject-matter of claims 2, 8, and 16 is not new.
 - (b) claims 3, 4, 9, 17: the transformer encoder and the transformer decoder of **D1** are a linear feedback filter and a linear filter, respectively (Figs.1-3). Hence the subject-matter of claims 3, 4, 9, and 17 is not new.
 - (c) claims 5, 6: **D1** discloses both a record carrier and a transmission medium (p.4, II.31-32). Hence the subject-matter of claims 5 and 6 is not new.
 - (d) claims 10: the transformer decoder of **D1** is a sliding block decoder (p.3, I.21). The circuit defined by claim 10 of the present application is merely one of several straightforward possibilities to implement this decoder. Therefore the subject-matter of claim 10 is not inventive.
 - (e) claims 11, 19: claims 11 and 19 do not add further subject-matter, because there is no alternative to implement a codec "*at least partly in software or hardware*". Therefore the subject-matter of claims 11 and 19 is not new.
 - (f) claims 12, 20: the modulation code of **D1** has a code rate close to 1 (p.3, I.1). Hence the subject-matter of claims 12 and 20 is not new.
 - (g) claims 13, 21: **D1** discloses a (0,k)-encoder and a (0,k)-decoder to obtain the modulation code. Hence the subject-matter of claims 13 and 21 is not new.
 - (h) claim 18: the circuit defined by claim 18 is a straightforward alternative to the circuit disclosed in **D1** (Figs.1, 2). Therefore the subject-matter of claim 18 is not inventive.